

Applicant Name Montana State University (MSU)
Project Name Channel Response Assessment for the Upper Blackfoot

Project Abstract

The Helena National Forest (HNF) has committed to fully restoring ecosystem function to the floodplains in the Upper Blackfoot Mining Complex. As the focus now turns to concerns over the fate of Mike Horse Dam and the ensuing restoration, it is more important than ever to fully understand the nature of the stream system. Upstream and downstream from Mike Horse Dam, floodplain ecosystem function is the product of centuries of natural variation in hydrology followed by decades of human changes in flow regime. The goal of this project is to assess the ecological response potential of floodplains associated with Mike Horse Dam. Two questions pertain to the Upper Blackfoot: (1) How can stream ecosystem restoration be maximized; and (2) how can risk of further contamination be minimized? The temporal and spatial contexts of the stream reaches will be used to classify their potential ecological response to changes in flow regime induced by dam construction, breach, and hazard reduction. Historic aerial photographs from 1938 (pre-construction), 1961 (post-construction), 1966 (pre-breath), 1979 (post-breath), 1995 (post-breath), and 2005 (pre-removal) will be used to track channel, floodplain, and riparian vegetation cover. Topographic surveys of flood stage indicators (flood scars and deposits) and valley-wide crosssections will be used to model Hydraulic Engineering Center-River Analysis System (HEC-RAS) past hydrologic events with step backwater and time varying techniques. From the historic ecological response classification, responses will be predicted to the proposed dam hazard reduction. To test this prediction, topographic, hydrologic, and biological data will be collected at the same locations before and after action on Mike Horse Dam. An evaluation of floodplain ecological response based on its spatial and temporal context within the watershed will distinguish dynamic reaches from stable reaches. Armed with this information decision makers can maximize restoration potential and minimize risk to contaminated sediment.